

WE CLAIM:

1. A heating appliance, comprising:
  - a combustion chamber enclosure defining a combustion chamber;
  - a burner positioned to generate a flame within the combustion chamber enclosure;
  - a variable valve coupled to the burner;
  - a controller coupled to the variable valve, the controller configured to generate a control signal for the variable valve to adjust a flow of combustible fuel delivered to the burner to generate at least one of a plurality of flame characteristic; and
  - an input device coupled to the controller for selecting one of the plurality of flame characteristics.
2. The heating appliance of claim 1, wherein the control signal adjusts the flow of combustible fuel through the variable valve, and the at least one flame characteristic is a modulated flame.
3. The heating appliance of claim 1, wherein the at least one flame characteristic includes a modulated flame having a modulation frequency and a modulation absolute temperature.
4. The heating appliance of claim 1, wherein the at least one flame characteristic includes a mean flame temperature measured over time.
5. The heating appliance of claim 4, wherein the mean flame temperature has a set value over time.
6. The heating appliance of claim 4, wherein the mean flame temperature increases over time.

7. The heating appliance of claim 4, wherein the mean flame temperature decreases over time.

8. The heating appliance of claim 1, wherein the controller is configured to provide at least two control signals, and each control signal relates to a separate one of the plurality of flame characteristics.

9. The heating appliance of claim 8, wherein the at least one flame characteristic associated with the control signal includes a first modulated flame having a first modulation frequency and a second flame characteristic associated with a second control signal includes a second modulated flame having a second modulation frequency.

10. The heating appliance of claim 1, wherein the controller includes a programmable processor and memory, and the processor uses an algorithm and algorithm inputs stored in the memory to generate the control signal.

11. The heating appliance of claim 1, wherein the input device is a display device that includes a display screen and input selectors.

12. The heating appliance of claim 1, wherein the variable valve includes a magnet and a wire coil configured to adjust a position of the magnet to achieve a pressure within the variable valve.

13. The heating appliance of claim 1, further comprising a sound system configured to produce sound in response to a sound control signal generated by the controller.

14. The heating appliance of claim 1, further comprising a scent generating system configured to produce a scent in response to a scent control signal generated by the controller.

15. The heating appliance of claim 1, wherein the at least one flame characteristic provides a variable flame amplitude to maintain a desired flame temperature.

16. A gas fireplace comprising:  
a combustion chamber enclosure defining a combustion chamber;  
a burner positioned to generate a flame within the combustion chamber enclosure;  
a variable valve configured to provide a combustible fuel to the burner;  
an input device configured for selection of a plurality of flame effects;  
and

a controller coupled to the variable valve and the input device, the controller configured to control the variable valve according to at least one of the plurality of flame effects to thereby selectively controlling fuel flow to the burner.

17. The fireplace of claim 16, further comprising a sensory output device configured to produce a sensor output corresponding to variations in the fuel flow to the burner.

18. The gas fireplace according to claim 17, wherein the sensory output device comprises a scent delivery system.

19. The gas fireplace according to claim 17, wherein the sensory output device comprises a sound system.

20. The gas fireplace according to claim 17, wherein the sensory output device comprises a scent delivery system and a sound system.

21. A flame control system, comprising:  
an input device configured to provide selection of at least one flame effect;

a controller configured to produce a control signal corresponding to the at least one flame effect; and

a flame modulator configured to modulate a flame in response to the control signal.

22. The system of claim 21, wherein the at least one flame effect is a modulated flame having a flame modulation frequency and a flame modulation absolute amplitude.

23. The system of claim 21, wherein the at least one flame effect is a mean flame temperature.

24. The system of claim 23, wherein the mean flame temperature increases over time.

25. The system of claim 23, wherein the mean flame temperature decreases over time.

26. The system of claim 23, wherein the mean flame temperature maintains a substantially constant temperature over time.

27. The system of claim 22, wherein the flame modulation absolute amplitude varies over time.

28. The system of claim 22, wherein the flame modulation frequency varies over time.

29. The system of claim 21, wherein the flame modulator is a variable gas valve.

30. The system of claim 21, wherein the input device is configured as a control panel having a plurality of user activated actuators.

31. The system of claim 21, further comprising a burner configured to generate the flame, wherein the flame modulator is configured to modulate delivery of a combustible fuel to the burner thereby modulating the flame.

32. A heating appliance, comprising:  
a combustion chamber enclosure defining a combustion chamber for the combustion of fuel;  
a burner configured to combust the fuel to produce a flame;  
a valve configured to control fuel flow to the burner; and  
a controller configured to generate a flame control signal that is delivered to the valve, the valve controlling fuel flow in response to the flame control signal to alter an amplitude and frequency of the flame.

33. A flame and sound system configured for use with a heating appliance, the system comprising:  
an input device configured for selection of at least one user preference;  
a controller system configured to generate a flame control signal and a sound control signal in response to the at least one user preference;  
a flame modulator configured to modulate a flame in response to the flame control signal; and  
a sound generating device configured to produce sound in response to the sound control signal.

34. The system of claim 33, further comprising a lighting device configured to produce light in response to a light control signal generated by the control system.

35. The system of claim 33, further comprising a scent generating device configured to produce a scent in response to a scent control signal generated by the control system.

36. The system of claim 33, further comprising a blower.

37. The system of claim 33, wherein the flame modulator includes a variable valve, the variable valve including a magnet and a conductive coil oriented adjacent the magnet, and a power source applied to the conductive coil moves the magnet relative to the conductive coil thereby altering a fuel flow through the valve that modulates the flame.

38. The system of claim 33, wherein the heating appliance is a fireplace comprising a combustion chamber enclosure defining a combustion chamber wherein a flame is generated.

39. The system of claim 33, wherein the sound and flame control signals are synchronized.

40. A method of controlling a flame in a fireplace, the method comprising the steps of:  
selecting at least one flame effect using a input device;  
generating a flame control signal corresponding to the at least one flame effect; and  
controlling a flame characteristic in accordance with the flame control signal.

41. The method of claim 40, wherein the at least one flame effect is a flame style.

42. The method of claim 40, wherein the at least one flame effect is a flame burn mode.

43. The method of claim 41, wherein the flame style includes a flame frequency and a flame absolute amplitude.

44. The method of claim 42, wherein the flame burn mode includes a mean flame amplitude over a given time period.

45. The method of claim 40, wherein controlling the flame characteristic includes modulating a flame amplitude.

46. The method of claim 40, wherein generating the flame control signal includes entering a data input corresponding to the at least one flame effect into an algorithm and calculating a control output.

47. The method of claim 46, wherein generating the flame control signal further includes entering the control output into a multiplier to generate the flame control signal.

48. The method of claim 40, wherein generating the flame control signal includes first entering a data input corresponding to the at least one selected flame effect into a multiplier to generate a multiplied data input, and then entering the multiplied data input into an algorithm to generate the flame control signal.

49. A method of controlling a heating appliance that includes a burner, a valve, a sound system, a scent delivery system, and a control system, the method comprising the steps of:

generating a control signal with a controller and communicating the control signal to the valve, the sound system, and the scent delivery system;

controlling a fuel flow from the gas valve to the burner in response to the control signal;  
controlling production of sound by the system in response to the control signal; and  
controlling production of scent by the scent delivery system in response to the control signal.

50. The method of claim 49, further comprising synchronizing control of the fuel flow, production of sound, and production of scent.

51. A method of thermostatically controlling a flame, the method comprising the steps of:

providing a first room temperature measurement;  
setting a target room temperature;  
generating a flame having a first flame amplitude configured to provide heat sufficient to attain the target room temperature;  
providing a second room temperature measurement;  
determining a difference between the target room temperature and the second room temperature measurement; and  
altering the first flame amplitude to a second flame amplitude when the determined difference is within a predetermined temperature range of the target room temperature.

53. A flame and sound system configured for use with a heating appliance, the system comprising:

an input device configured for selection of at least one user preference;  
a controller system configured to generate a flame control signal and a scent control signal in response to the selected user preference;  
a flame modulator configured to modulate a flame in response to the flame control signal; and



a scent generating device configured to generate a scent in response to the scent control signal.

54. The system of claim 53, wherein the flame control signal and scent control signal are synchronized.